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THESIS

INCOME, EDUCATION, AND ABILITY:
THE UTILITY OF ALTERNATIVE MEASURES OF ABILITY

by

Edwin James Knowles Jr.

December 1986

Thesis Advisor: George W. Thomas

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Income, Education, and Ability:
The Utility of Alternative Measures of Ability

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requirements for the degree of

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ABSTRACT

This thesis analyzes the effect of innate ability on earnings differentials by using a standard human capital earnings function. The data used is the 1984 panel (Round 6) of the National Longitudinal Survey for Youth aged 14 to 21 in 1979. AFQT and Coding Speed (the Armed Services Vocational Aptitude Battery (ASVAB) Form 8A subtest) were examined and compared for the utility of each as a valid ability measure. The primary finding is that, although Coding Speed demonstrated utility as an ability proxy, AFQT functioned much more effectively. While the effect of innate ability by itself on earnings was found to be relatively small, the inclusion of measures of ability in human capital earnings equations substantially reduced the estimates of the returns from education.

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I. INTRODUCTION

A. PROBLEM

The factors that affect the variation in individual wage rates have long been the focus of economic interest and study. Recent studies have centered primarily on deriving the rate of return of income-related factors by estimating a human capital earnings function. This technique allows the effect of various human capital, environmental, and personal factors on earnings differentials to be estimated.

One acknowledged human capital factor, however, that has escaped widespread scrutiny is innate ability. Innate ability is an important component in the analysis of income differences, since it is assumed that for a given level of education, more capable individuals will acquire skills more quickly than less capable people. Therefore, more capable individuals become more productive to the employer and receive higher wages.

The basic difficulty in isolating the sole contribution of innate abilty is two-fold; there is a general lack of valid ability measures and relatively few databases exist which contain them. The absence of measures of innate ability has affected estimations of the effect of education on earnings differentials [Ref. 1:p. S108]. Since most estimates of the rate of return to education on income have been made without accounting for ability, these estimations are upwardly biased

[Ref. 2:p. 4]. Inclusion of a valid ability measure in a standard human capital earnings function can correct this deficiency, yielding an unbiased estimation of the rate of return to education.

The National Longitudinal Survey (NLS) for Youth provides an extremely useful vehicle for pursuing an analysis of the effect of ability on earnings. The NLS contains extensive data on earnings, educational attainment, employment history, and a myriad of other human capital and environmental factors. More importantly, this dataset contains test scores from the Armed Services Vocational Aptitude Battery (ASVAB) Form 8A, which was administered to this sample in 1979. This ASVAB consists of ten component subtests used by the services for enlistment eligibility and recruit placement.

It is the intent of this thesis to examine the relationship between innate ability and education and analyze the effects of these factors on income differences. It must be noted that these equations will be estimated for early labor force earnings and this fact must be considered when interpreting the results. For this project, innate ability is defined as an individual's genetically-determined endowment of capability at birth. This initial stock is built upon as the individual matures, gains experience, and makes investments in human capital, most notably education. Education provides the individual with new abilities through acquired skills. Attempting to differentiate between innate

ability and derived ability through education is very difficult since most measurements are made after schooling has occured. To negate this problem, research has sought ability measures which minimize reliance on acquired skills.

It is hypothesized that inclusion of a valid ability measure in the standard human capital earnings function will yield a measure of the effect of innate ability on earnings, and, by including an ability measure, an unbiased estimation of the effect of education on income may be achieved.

B. REVIEW OF PAST STUDIES

Several previous studies have attempted to differentiate between the effects of ability and education on earnings. Ashenfelter and Mooney utilized the verbal, mathematical, and mean aptitude scores from the Scholastic Aptitude Test, and whether or not an individual was a Phi Beta Kappa as an undergraduate as ability measures. They found that only mathematical ability had a substantive and significant effect on earnings [Ref. 3]. A 1972 study by Hause found that the effect of ability on earnings is negligible at low levels of education, but its influence increases as educational attainment rises [Ref. 1]. Griliches and Mason, using AFQT as an ability measure, found that ability did not have a significant effect on income differences [Ref. 4]. A 1974 work by Taubman and Wales found that IQ had a substantial and significant effect on earnings for individuals in

professional, semi-professional-managerial, and sales occupations [Ref. 5]. Boissiere, Knight, and Sabot found that direct returns to ability were small, those to years of education were moderate, and those to cognitive achievement were large [Ref. 6].

1. Boissiere, Knight, and Sabot (1985)

Boissiere, Knight, and Sabot found that reasoning ability provided only minor positive returns while numeracy and literacy resulted in large, significant returns.

The study was conducted in Kenya and Tanzania. The respondents, 205 in Kenya and 179 in Tanzania, provided earnings, education, and employment information and each was tested for intelligence, verbal proficiency, and mathematical skill. Reasoning ability was measured by means of the "Raven's Progressive Matrices", which involves matching pictorial patterns. The tests for numeracy and literacy were developed by the Educational Testing Service at Princeton University for use in this study.

The authors formulated a regression equation consisting of the following independent variables - education (a binary variable signifying that the individual has completed secondary education with individuals who completed primary education serving as the reference group), experience, experience squared, reasoning ability, and cognitive achievement as the independent variables. The natural log of

pre-tax earnings served as the dependent variable. The model was estimated with the data from each country.

In neither country was the effect of reasoning ability either large or significant. Direct returns to cognitive achievement, however, were positive, significant, and large relative to the returns from their ability measure [Ref. 6:p. 1020]. The authors also stratified the regressions by white- and blue-collar occupations and then by level of education (primary vs. secondary). In each case, the coefficient of ability was neither large nor significant. Regardless of the stratum, cognitive achievement resulted in large and significant effects on income (with the exception of manual workers and primary-educated individuals in Tanzania) relative to the ability measure.

2. Taubman and Wales (1974)

In analyzing the National Bureau of Economic Research - Thorndike and Hagen data set [Ref. 5:p. 8], Taubman and Wales utilized single equation regressions to investigate the influence of formal schooling, ability, age, family background, and other personal characteristics on the level of observed earnings in 1955 and in 1969. The data set provided measures of mathematical ability, coordination, verbal ability, and spatial perception. Of this variety of measures, the authors found that only mathematical ability had a significant effect on earnings.

Like the Boissiere, Knight, and Sabot study, Taubman and Wales also estimated earnings functions by occupation and found that none of the ability measures were significant in blue-collar occupations, but mathematical ability was significant in the managerial, professional, technical, and sales groups. [Ref. 5:p. 8]

Taubman and Wales also analyzed data collected by Wolfle and Smith (1956) on Minnesota high school graduates of 1938 to estimate the effects of ability on earnings in 1953. IQ was used as the ability measure and, to allow for non-linear effects, the scores were divided into tenths. The data set also contained information by the nine census occupational categories and the authors, to preserve degrees of freedom, grouped the data by: (1) the three highest paying occupations (professional, semi-professional-managerial, and sales), and (2) the remaining five categories (clerical, service, skilled, farm, and unskilled). The ninth category (housewife) was ignored. The aggregated data provided 30 observations for group 1 and 50 observations for group 2.

The regression equation consisted of two binary ability variables - one for individuals in the highest IQ decitile (most intelligent) and the other for individuals in the fifth through ninth IQ decitiles (individuals in the first through fourth IQ decitiles were used as the reference group). The five remaining human capital variables (all binary) in the equation focused on education - (1) whether or not the

individual attended vocational, military, or other non-college school, (2) whether or not the individual attended college, but for less than two years, (3) whether or not the individual attended college for two or more years, (4) whether or not the individual had an undergraduate degree, but no graduate degree, and (5) whether or not the individual had more than one degree.

This basic model was estimated for each occupational group. A dichotomous, independent variable for occupation was included. For the high-paying group, the dummy variable indicated whether or not the individual was in a semi-professional-managerial or sales position (professionals serve as the reference group), while for the lower paying group, it indicated whether or not the individual was in a clerical, service, or skilled position (farm and unskilled serve as the reference group).

Taubman and Wales found that the ability variable had a significant and numerically important effect on income for the high-paying group, but not for the lower-paying occupations. Individuals in the tenth IQ decitile strata earned nearly $1,900 more than those in the bottom four IQ decitiles. [Ref. 5:p. 53]

The authors also addressed the argument that using "rank in class" would provide a better measure of ability since it is indicative of not only mental ability, but perhaps drive and motivation as well. Taubman and Wales substituted

"rank in class" for IQ as the ability measure and found the results disappointing. The coefficients were much smaller and no longer significant, leading the authors to conclude that "rank in class" was inferior to IQ as a measure of ability. [Ref. 5:p. 51]

It is worth noting, however, that in each sample the coefficents of the ability variable were never large nor significant.

3. Griliches and Mason (1972)

Using AFQT as a measure of ability, Griliches and Mason found the direct returns from ability were neither large nor significant and that its net contribution to the explanation of the variation in earnings was very small. [Ref. 4:p. S88]

The authors analyzed the data from a sample of 1,454 post-world war II veterans between the ages 16-34 in 1964. Each respondent provided information about occupation, income, education, and family background. Inclusion in the sample required available AFQT scores.

Griliches and Mason formulated a regression equation with the logarithm of income (gross weekly earnings in dollars) as the dependent variable. The independent variables consisted of AFQT as the ability measure as well as numerous personal background, location, and current achievement variables [Ref. 4:p. S78]. Education was measured in years of schooling completed and was recorded at two points in time:

before entry into military service and at the time of the survey. By taking the difference, a measure of incremental schooling was derived. This incremental schooling variable was central to the analysis since it is a measure of schooling which occured after ability (AFQT) was measured and, therefore, should not be correlated to the level of education achieved [Ref. 4:p. S79]. A very small correlation between AFQT and the schooling increment was found.

In examining the relationship of education, ability, and background, Griliches and Mason found that including ability and background variables in the model, the direct return to education was 4.6%. This is a reduction of 12% from the value of the education coefficient (.0528) when these variables were omitted. The largest value attained for ability was only .00252, which was not significant at the .05 level.

4. Hause (1972)

Hause examined the relationship between earnings, education, and ability by analyzing four different samples of cohort data - (1) the National Bureau of Economic Research (NBER) - Thorndike sample, (2) the Rogers sample, (3) the Project Talent sample, and (4) the Husen sample. The author's hypotheses were: (1) the relative effect of measured ability on earnings increases as the level of education increases, and (2) the effect of ability on earnings over time, for a given level of education, should not decrease.

The NBER - Thorndike sample is composed of 2,263 white males who were born in the period 1921 - 1925. They passed a battery of tests given potential pilots and navigators in 1943. Components of these tests are utilized as ability measures. To examine the role of schooling, Hause established an education stratum consisting of six levels - (1) high school graduates, (2) some college, (3) college graduate with one degree, (4) college graduate with two or more degrees, (5) lawyer, and (6) medical doctor. As background variables, Hause utilized father's education, religion, marital status, and region.

To test hypothesis 1, all observations were pooled, with the exception of doctors, and a regression of 1969 earnings was run on the background variables, ability, years of schooling, and an interaction term (years of schooling X ability). [Ref. 1:p. S115]

Despite the high multicollinearity between ability, years of schooling, and the interaction term, the interaction term was positive and significant (at the .02 level) which supported hypothesis 1 [Ref. 1:p. S115]. In testing hypothesis 2, a two-stage regression was used to determine whether earnings in 1955 captured most of the effect of measured ability and, therefore, whether ability would then have a negligible effect on 1969 earnings. Hause found that the ability coefficients from these regressions were positive,

indicating the increasing role of ability over time in explaining income differences [Ref. 1:p. S116].

The Rogers sample consisted of 343 white males, most of whom were eighth graders in 1935. Although utilizing the same analysis procedures for this data set, Hause formulated a slightly different regression equation with both earnings and log-earnings serving as the dependent variables. As independent variables, Hause included IQ as an ability measure and the background variables of socioeconomic status, religion, private school attendence, and marital status. Again the regression equation was estimated for individual education levels as well as the aggregate data, although the strata were slightly different for this sample. They were: (1) high school non-graduates, (2) high school graduates, (3) college non-graduates, (4) college graduates with one degree, and (5) graduate degree holders.

Regression results again supported both hypotheses with the interaction term (IQ X years of education) positive and, with log-earnings as the dependent variable. The interaction term was positive and statistically significant, while two-stage regression again resulted in the IQ coefficients being positive, indicating an increasing effect over time. [Ref. 1:p. S120]

Project Talent data analyzed by Hause consisted of 8,840 white males, full-time employed in 1966, who took the Project Talent battery of ability and achievement tests in

1959. This battery provided several ability measures - (1) C001 (a composite test score reported to be highly correlated with IQ), C004 (a composite quantitative test score), R410 (arithmetic computation), and R430 (clerical checking). [Ref. 1:p. S123]

Hause established five education levels for this sample - (1) high school non-graduates, (2) high school graduates, (3) college non-graduates (2 or less years of college completed), (4) college non-graduates (3 to 4 years of college), and (5) college graduates with one degree. For background variables, Hause utilized the family's socioeconomic status, religion, non-public school attendance prior to college, marital status, region, and the log of weeks worked the past year. These background variables and the ability measures were regressed on the logarithm of 1962 and 1966 earnings for each education level.

The coefficients for C001 and C004 were negative in the 1962 regression for high school graduates one year out of school with C001 being significant at the .05 level, although the effect was small [Ref. 1:p. S125]. The 1965 regressions revealed that none of the ability coefficients were both significant and negative while C004 (with a coefficient of .11) and R430 (with a coefficient of .12) were positive and significant for high school graduates [Ref. 1:p. S125]. For college non-graduates, neither C001 nor C004 was significant, but R430 for college non-graduates (2 or less years) and R410

for non-graduates with 3 to 4 years of college were statistically significant and represent modest effects on earnings [Ref. 1:p. S126].

The Husen sample contains data on 450 Swedish males who were third graders when first tested in 1938. To deal with the substantial difference between the U.S. and Swedish educational systems, Hause establishes seven education levels along with their approximate U.S. equivalent - (1) folkskola not completed (elementary school), (2) folkskola completed (usually at 14), (3) some realskola (secondary school), (4) realexamen (realskola completed, usually at age 16 or 17) and technical school graduate, (5) studentexamen (completion of the gymnasium, roughly junior college, at ages 19-21, including a test required for entry into Swedish universities), (6) university degree holder, and (7) medical doctor or dentist. [Ref. 1:p. S126]

One ability measure (TST38) was based on an IQ-type test given in 1938 and another ability measure (IQ48) was available for veterans in the sample who were tested for IQ in 1948. The background variables consist of marital status, social class, and serious, prolonged illness during the person's late teens or thereafter.

The results generally support hypothesis 1 (hypothesis 2 was not tested), with the exception of the second education level. Using the IQ48 measure, Hause found an earnings differential of 10% or more for individuals completing

realexamen or studentexamen, which is comparable to the results for college graduates in the Rogers sample. [Ref. 1:p. S130]

In summary, Hause's work indicates, for low levels of education, ability has a small to negligible effect on earnings and, for high levels of schooling, ability (within one standard deviation of the sample schooling class) is associated with earnings differentials ranging from 10 to 13% by the time males are 35-40 years old [Ref. 1:p. S131].

5. Ashenfelter and Mooney (1968)

Ashenfelter and Mooney attempted to determine: (1) what type of ability index is relevant for highly educated persons, (2) the quantitative importance of an ability index, and (3) how parameter estimates of schooling-related variables are changed by inclusion of an ability variable [Ref. 3:p. 78].

The regression equation was formulated around a set of dichotomous variables - Field of Graduate Study (Humanities, Social Sciences, and Natural Sciences), number of years of graduate education, the highest degree held (B.A., Master's, Ph. D, or other), Profession (college teacher or other), and number of years working (0 - 5). The respondent's mathematics aptitude score on the Scholastic Aptitude Test (SAT) served as the ability measure. The authors experimented with using the verbal aptitude score, the mean aptitude score (average between the verbal and math aptitude scores on the SAT) and a

binary variable (whether or not the individual was Phi Beta Kappa as an undergraduate) as an ability measure, but none of these measures proved significant.

Mathematical aptitude was significant at the .05 level and the coefficient was 2.1, which represents a difference in income of two dollars for every point difference [Ref. 3:p. 83]. In regressing the equation without an ability variable, the change in the education related variables was quite small.

C. SUMMARY

In summary, for nearly twenty years, research has been conducted to capture the effect of ability on earnings differentials using human capital earnings equations. If individuals with higher ability do earn more (at a given level of education), failure to account for ability will result in overstating the economic returns to education. In attempting to isolate the effect of ability on income, past studies noted have derived mixed results.

Boissere, Knight, and Sabot [Ref. 6], using Raven's Progressive Matrices as an ability measure, and Griliches and Mason [Ref 4], using AFQT as an ability measure, found that ability was not a significant factor in explaining earnings differences. Ashenfelter and Mooney [Ref. 3], using the mathematical and verbal components of the Scholastic Aptitude Test as ability measures, found that only mathematical ability had a significant effect on earnings. Taubman and Wales [Ref.

5] also found that math ability had a significant effect on income, but only for higher paying occupational groups - professional, managerial, technical, and sales. Taubman and Wales also found that IQ had a significant effect on earnings for these groups, but not for blue collar workers. Hause [Ref. 1] found that ability's effect on earnings increases as the level of education rises and this effect does not decrease over time.

While the results of these studies have not been conclusive, they have provided insight into this area of inquiry. Unquestionably, the economic relationship between education, earnings, and ability is a complex one and not easily analyzed. Further, more exhaustive work in this area has been hindered by a lack of large databases which contain viable ability measures. Ideally, pre-school measures of ability would function best in this capacity. Lack of valid ability measures is the greatest deficiency in this area.

The next chapter will present a detailed description of the dataset (NLS), the analysis methodology, the model and definitions of the variables which comprise it. The third chapter will contain the results of the analysis by educational and occupational grouping. The last chapter will present conclusions and recommendations for further research.

II. DATA AND METHODOLOGY

A. DATA

1. Data Base

The data base used for this thesis is the National Longitudinal Survey of Youth, conducted by the Center for Human Resource Research at Ohio State University. The Department of Labor contracted the Center for the initial studies in 1965 which would focus on four groups in the population - 45 to 59 year old men, 30 to 44 year old women, and young men and women ages 14 to 24. The surveys were "designed primarily to analyze the sources of variation in the labor market behavior and experience of the age-sex subsets of the population represented by the samples" [Ref. 7:p. 15].

In 1977 the decision was made to begin a new longitudinal study of young men and women which would permit a replication of much of the analysis made of the earlier cohorts of youth and also to assist in evaluating the expanded employment and training programs for youth legislated by the 1977 amendments to the Comprehensive Employment and Training Act [Ref. 7:p. 2]. To achieve this, a national probability sample was drawn consisting of 5,700 young women and 5,700 young men between the ages of 14 and 21 in 1979. The cohort is over-representative of blacks, Hispanics, and economically disadvantaged whites. An additional 1,300 persons serving in

the Armed Forces were selected for interviewing under funding from the Department of Defense and the services.

A special characteristic of this data set is that in 1979 all respondents were given the Armed Forces Vocational Aptitude Battery (ASVAB) Form 8A, which consists of ten component subtests - (1) General Science, (2) Auto & Shop Information, (3) Aritnmetic Reasoning, (4) Math Knowledge, (5) Word Knowledge, (6) Paragraph Comprehension, (7) Coding Speed (8) Numerical Operations, (9) Electronics Information, and (10) Mechanical Comprehension. Appendix A contains complete descriptions of each subtest. Based on the ASVAB scores, a recruit's "trainability" in these select areas is estimated and used to place the recruit in specific military jobs.

The military uses many composites from the ASVAB for occupational screening and selection. The Armed Forces Qualifying Test (AFQT) is a composite of four of these subtests - Numerical Operations (NO), Arithmetic Reasoning (AR), Word Knowledge (WK), and Paragraph Comprehension (PC). AFQT is computed by summing the raw scores according to the following formula:

$$AFQT = WK + PC + AR + NO/2 \qquad \text{(eqn 2.1)}$$

This figure is then normalized by a conversion table which yields a percentile score for the recruit. This score is used to determine a perspective recruit's eligibility for enlistment.

The National Longitudinal Survey of Youth contains variables which are classified, although somewhat imperfectly, under three primary headings - (1) labor market experience variables, (2) human capital and other socioeconomic variables, and (3) environmental variables. The following outline summarizes the major elements of the survey by year for the youth cohort [Ref. 7:p. 49]:

a. <u>Labor Market Experience Variables</u>

(1) Current Labor Force and Employment Status and Characteristics of the Current Job

Survey Week labor force and employment status

Occupation (Census code)

Occupation (DOT code)

Industry

Class of worker

Starting date

Number of hours worked in survey week

Number of hours per week worked

Shift worked

Hourly rate of pay

Covered by collective bargaining?

Availability of vacation and insurance benefits on the job

Reason for leaving job

Global job satisfaction item

Participation in work-study program

Job search activities and intentions

(2) Work Experience since 1 January 1978

Number of weeks worked

Number of hours worked per week

Number of weeks unemployed

Spells of unemployment

Number of weeks OLF

Participation in work study program

(3) Characteristics of Jobs with More Than 20 Hours per Week and More Than 9 Weeks in Duration since 1 January 1978

Occupation (Census code)

Industry

Class of worker

Number of hours worker per week

Hourly rate of pay

Covered by collective bargaining?

Reason for leaving job

b. Human Capital and Other Socioeconomic Variables

(1) Early Formative Influences

Nationality and birthday

Ethnic self-identification

(2) Education

Current enrollment status

Highest grade of school completed

Reason stopped attending school

Date of last enrollment

Attended private or public school

High school curriculum

College degree received

Type of college attending

Field of study in college

(3) Vocational Training outside Regular School

Type(s) of training

Duration of training programs

Whether training was completed

Hours per week in training

Whether training related to specific job

Method of financing training

(4) Government Jobs and Training Programs

Participation in programs

Type of program

Satisfaction with program

Participation in program of aid on subsequent jobs

Services provided by program

Length of participation in program

Hours per week and per day in program

Amount of income from participating in program

Reasons for entering and leaving programs

(5) Health and Physical Condition

Does health limit work

Duration of health limitation

(6) Marital and Family Characteristics

Marital status

Number of dependents

Education of family members

Occupation of spouse

Extent of work of spouse in survey year

Number and duration of marriages

Number and age distribution of children living in household

(7) Financial Characteristics

Total family income in previous year

Income of respondent (and spouse) from farm or own business in previous year

Income of respondent (and spouse) from salary and wages in previous year

Income of respondent (and spouse) from unemployment compensation in previous year

Income from public assistance in previous year

Income from food stamps in previous year

Income from pensions and Social Security

Income from military service

Income form other sources in previous year

c. <u>Environmental Variables</u>

(1) Residency Information

Current residence urban or rural

Does respondent live in SMSA

Unemployment rate of local labor market

From a human capital perspective, this data set provides a unique opportunity to examine the effects of innate ability, education, and other dimensions of human capital on earnings differentials.

B. METHODOLOGY

1. Sample Reduction

The focus of this research is on the development of useful measures of ability and education on earnings of full time employed civilian workers. For the purpose of this study, full time employed is defined to be those individuals in the sample who worked at least 35 weeks in 1983 and spent less than 4 weeks unemployed and/or less than 4 weeks out of the labor force (OLF) in 1983. The arbitrary cutoff of 35 weeks was made to capture those individuals who are full time employed but only work a portion of the year. For example, full time employed teachers normally work only nine months (36 weeks) out of the year. The arbitrary allowance of up to 4 weeks of unemployment and/or OLF is in recognition of the fact that this cohort is in the early stage of its work history and voluntary job changes are much more frequent.

An additional selection criteria required the respondent not be currently in the military. Since our intent is the examination of earnings differentials in the civilian labor market, military members are not included in the analysis. A third condition was that the respondent be at least eighteen years old, since full time employment does not normally occur prior to this age. To preclude the possibility of income not derived through labor market participation, a fourth condition was that the respondent not be self-employed.

Even with the previous constraints, a large number of respondents listed their annual income at less than $1,000. To eliminate these spurious income observations, a minimum income level of $5,000 was established. This figure was calculated by taking the current minimum wage of $3.35 and multiplying it by a forty hour work week for 35 weeks, which yielded $4,690. This figure was arbitrarily rounded up to $5,000. Applying this constraint, the final sample size was 3,608.

2. Formulation of the Regression Equation

The functional form of the standard human capital earnings equation will be used for this analysis and can be expressed as:

$$\ln Y = a_0 + b_i EF_i \qquad \text{(eqn 2.2)}$$

where Y is income and EF_i is the quantity of the i^{th} earnings factor. In this format, the coefficient of an earnings factor can be interpreted as the rate of return from that factor. [Ref. 8:p. 313]

a. The Dependent Variable

The natural logarithm of salary and wages in 1983 will be used.

b. The Independent Variables

The independent variables chosen for the regression equation were selected from those well established in the literature as human capital factors used in explaining earnings differentials. The data set contains measures of education, experience, sex, race, marital status, number of

dependents, and area of residence. Age was not included due to the high collinearity (.65) between it and experience.

Two proxies for ability will be examined. First, AFQT will be used to capture the effect of ability. The Griliches and Mason study [Ref. 4] indicates that AFQT may have limited utility as an ability measure. The standardized score on the Coding Speed ASVAB component subtest will also be examined and compared with AFQT as a useful measure of ability. This subtest emphasizes speed and accuracy in matching the code numbers for certain words in the test booklet with those on the answer sheet. Performance on this subtest does not depend on acquired skills, but rather on memory and visual perception. The assumption is that these particular skills are characteristic of innate ability.

Prior to comparing the utility of AFQT and Coding Speed, it seems appropriate to validate their utilization as proxies for ability. The fact that the rate of return to an education variable is overestimated when an ability measure is omitted from the regression equation provides a technique to judge the validity of a perspective proxy. The technique requires that the rate of return to education be estimated without an ability measure in the equation. Then the equation is estimated with an ability measure entered, noting the effect on the size of the education coefficient. This procedure not only permits the validity of a proxy to be

examined but also allows comparsions between proxies to be made.

c. Conduct of the Analysis

The data will be analyzed in three phases. The first phase will consist of three steps. First, the regression equation, without an ability measure entered, will be estimated. Second, the model will then be estimated with AFQT as the ability measure. The third step will merely substitute Coding Speed in the equation for AFQT. The model will be estimated, according to the above procedure, using the aggregate sample, two subsets of the aggregate sample differentiated by education, and five occupational subgroups. This will allow the performance of the proxies to be evaluated over a series of samples.

The educational subsets will consist of (1) high school graduates and below and (2) college attendees with greater than 25 semester credit hours. This credit hour constraint was applied to make a clear distinction between full- and part-time college attendees.

The five occupational subgroups will consist of (1) managerial and professional, (2) sales, (3) service, (4) technical, and (5) clerical and administrative occupations.

Phase two will consist of stratifying the dataset by four educational classes. These classes are: Education Class 1, non-high school graduate and below; Education Class 2, high school graduate but less than 2 years of college;

Education Class 3, greater than 2 years of college but less than a 4 year degree; Education Class 4, a 4 year degree or higher. This stratification will permit a comparsion of the utility of AFQT and Coding Speed as ability proxies within narrowly defined educational boundaries. Beta (standardized) coefficients will be used for these comparsions to provide a common scale to judge their performance.

Phase three will consist of estimating the model for each occupational group within the above educational strata. This will allow the ability proxies to be compared for different occupations at various levels of schooling. This examination will be limited due to the small sample sizes encountered.

C. DERIVATION OF THE VARIABLES

All variables used in the regression equations are derived from variables contained in the National Longitudinal Survey of Youth aged 14 to 21 in 1979. The definition of each variable is explained below:

<u>AGE</u>: the age of the respondent in 1983, computed by adding 4 years to the variable age in 1979. For example, a nineteen year old respondent in 1979 would be assigned an age of twenty-three in 1983.

RACE: a set of dichotomous variables specifing whether or not the respondent is black, white, or a non-black minority member. The variable, BLACK, delineates whether or not the respondent is black or non-black. If black, a value of one is assigned. If non-black, a value of zero is assigned. The variable, OTHER, specifies whether or not the respondent is a non-black minority member. If a non-black minority member, a value of 1 is assigned. If not, a value of 0 is assigned.

INC83: the wages and salary of the respondent in 1983.

LINC83: the natural logarithm of INC83.

EDUC: a variable representing the highest grade completed by the respondent.

EDSQ: EDUC squared.

MARSTA: a binary variable delineating the marital status of the respondent. If married, a value of 1 is assigned. If unmarried, a value of 0 is assigned.

DEP: the number of the respondent's dependents, excluding the spouse.

SEX: a binary variable specifying the respondent's sex. If male, a value of one is assigned. If female, a value of 0 is assigned.

EXP: an estimate of the workforce experience of the respondent in years. Based on a methodology by Griliches [Ref. 2], the estimation is derived by subtracting the number of years of education plus six from the respondent's age in a given year.

EXPSQ: years of experience squared.

REGION: a dichotomous variable specifying whether or not the respondent resides in the south or another region in the country. If the individual resides in the south, a value of 1 is assigned. If the individuals resides in north, west, or northeast, a value of 0 is assigned.

[illegible]: the length of time in years spent on the respondent's current job.

ABIL: the standardized score on the Coding Speed ASVAB component subtest. This variable will serve as a proxy for ability.

AFQT: the Armed Forces Qualification Test. This variable will also function as an ability measure.

OLF: a variable representing the number of weeks out of the labor force.

UNEMPL: a variable representing the number of weeks unemployed.

Based on the selection on the dependent and independent variables, the general form of the equation is:

LINC83 = a(0) + b(1)EDUC + b(2)EXP + (eqn 2.3)

b(3)EXPSQ + b(4)AFQT + b(5)SEX + b(6)BLACK + b(7)OTHER +

b(8)DEP + b(9)MARSTA + b(10)UNEMPL + b(11)REGION + b(12)OLF +

b(12)EDSQ + b(13)FARM

D. ADJUSTING THE COEFFICIENTS OF DICHOTOMOUS VARIABLES

Halvorsen and Palmquist [Ref. 9] point out that the coefficients of dichotomous variables cannot be correctly interpreted as the relative effect of that variable on the

dependent variable. To properly adjust the coefficent, the following transformation is required:

$$g = \exp(c) - 1 \qquad \text{(eqn 2.4)}$$

where g is the relative effect of the coefficient on the dependent variable and c is the actual coefficient of the dichotomous variable estimated by the regression equation.

The percentage effect is derived through the following:

$$100 * g = 100 * [\exp(c) - 1] \qquad \text{(eqn 2.5)}$$

All coefficients of dichotomus variables listed in this text are unadjusted. Appendix B contains the adjusted coefficients.

III. ANALYSIS

A. DESCRIPTIVE STATISTICS

1. An Overview

Round six (1984) of the NLS - Youth sample contains 12,069 observations. The contraints discussed in the previous chapter reduced the usable sample to 3608. This reduced sample is composed of 54.3% male and 62.7% of the sample is unmarried. The respondents are ages 18 to 27 with the average age being 23.4 years. The racial composition of the sample is 75% white and 19% black, with the remaining 6% being non-black minority members. 38% of the respondents reside in the south while 13.2% live on a farm or in a rural area. The average education level of the sample is 12.73 years with average income being $13,296. Appendix C contains the summary statistics for each sample subgroup used in the analysis.

B. VALIDATION OF THE ABILITY MEASURES

1. Aggregate Sample

Using the full 3608 individuals in the constrained sample, the model was estimated with AFQT as an ability measure. As shown in Table I, the AFQT model had ten out of the fourteen variables being statistically significant at the .001 level. With Coding Speed (ABIL) in the model, eleven of the variables were significant at the .001 level. BLACK, OTHER, DEP, and EDUC were not significant at the .05 level in

TABLE I

COMPARISON OF REGRESSION COEFFICIENTS

Variables	Aggregate AFQT	Aggregate ABIL	H.S. Grads & Below AFQT	H.S. Grads & Below ABIL	College Attendees AFQT	College Attendees ABIL
AFQT	.003***	---	.003***	---	.003***	---
ABIL	---	.005***	---	.004***	---	.004**
EDUC	-.049	-.050	-.135	-.069*	.210	.234
EDSQ	.004***	.005***	.009***	.011***	-.004	-.004
EXP	.128***	.131***	.093***	.096***	.190***	.192***
EXPSQ	-.007***	-.007***	-.004***	-.004***	-.015***	-.015***
SEX	.206**	.233***	.248***	.273***	.148***	.174***
BLACK	-.007	-.052**	-.046*	-.083***	.048	-.016
OTHER	.033	-.001	.069*	.032	-.105	-.140*
MARSTA	.095***	.095***	.091***	.088***	.093**	.100***
REGION	-.043**	-.050***	-.048***	-.057***	-.013	-.019
DEP	-.003	-.005	-.001	-.002	.023	.021
OLF	-.039***	-.039***	-.023*	-.022**	-.058***	-.060***
UNEMP	-.058***	-.058***	-.053***	-.056***	-.093***	-.089***
FARM	-.066***	-.070***	-.039	-.040	-.141**	-.160***
N	3608		2187		1053	

* - significant at the .05 level.
** - significant at the .01 level.
*** - significant at the .001 level.

the AFQT model. These variables were also not significant in the ABIL model with the exception of BLACK, which was significant at the .004 level. For the vast majority of subgroups analyzed, these variables were not statistically significant. For DEP, this finding was not surprising since these are relatively young individuals and the mean number of dependents was only .4. The insignificance of the RACE variables was somewhat more perplexing. This finding could be the result of the over-representation of economically disadvantaged whites in the sample [Ref. 7] which could blur the distinction between white and minority membership.

For both models, the variable with the largest effect on earnings was SEX. At the average income of $13,269, males enjoyed an income premium of $2,739 in the AFQT model and $3,098 in the ABIL model. This suggests that occupational selection is quite different by gender and/or that substantial differences still exist between the starting wages for men and women. Married individuals in the sample enjoyed an income premium of $1,263 (for both models) over unmarried individuals.

Regional wage differences indicated that, on average, residing in the south (REGION) had a negative impact of $572 on earnings in the AFQT model and $665 for the ABIL model. Negative returns ($878 for the AFQT model and $931 for ABIL model) were also found for residing in a rural area or farm

area (FARM). Appendix D contains more detailed information by educational and occupational subgroup for the full model.

The dependency of the estimated rate of return to education upon the presence of an ability measure is demonstrated by comparing model results with and without ability measures. The regression coefficients and beta cofficients that were estimated without ability measures in the model for the aggregate and educational subgroups are presented in Appendix E. The effect of an additional year of education is determined by computing the partial derivative of the log of income with respect to education:

$$\ln Y = b_1(\text{EDUC}) + b_2(\text{EDUC})^2 \qquad \text{(eqn 2.6)}$$

Then: $$\frac{\partial \ln Y}{\partial(\text{EDUC})} = b_1 + 2(b_2)(\text{EDUC}) \qquad \text{(eqn 2.7)}$$

The rate of return for an additional year of education was 8.8% when the model was estimated without an ability measure. As shown in Table II, at the average income of $13,296 and the average level of education of 12.73 years, an 8.8% rate of return equates to a premium of $1,170. By including AFQT in the equation, the rate of return fell to 5.3%, a reduction of 40%. Inclusion of ABIL in the model yielded a rate of return of 7.7%, a decline of nearly 13%. These results suggest that AFQT has more impact as an ability proxy on measured returns to education than does ABIL. When AFQT is included as a measure of ability, the effect of additional education on income drops from $1,170 to $705.

TABLE II

COMPARISON OF THE RETURNS TO EDUCATION WITH AND WITHOUT ABILITY MEASURES

Sample	Without Ability Measures	With AFQT	With ABIL
Aggregate N=3608	$1,170 (8.8%)	$1,024 (7.7%)	$705 (5.3%)
H.S. Graduates & Below N=2187	$1,476 (11.1%)	$1,130 (8.5%)	$971 (7.3%)
College Attendees N=1053	$5,624 (42.3%)	$1,529 (11.5%)	$1,210 (9.1%)
Technical Occupations N=204	$3,231 (24.3%)	$1,596 (12%)	$1077 (8.1%)
Service Occupations N=544	$917 (6.9%)	$519 (3.9%)	$465 (3.5%)
Man-Prof Occupations N=565	$997 (7.5%)	$771 (5.8%)	$492 (3.7%)
Clerical-Admin Occupations N=844	$1,343 (10.1%)	$1,037 (7.8%)	$878 (6.6%)
Sales Occupations N=355	$904 (6.8%)	$652 (4.9%)	$532 (4.0%)

2. Educational Subgroups

a. College Attendees

As shown in Table II, for college attendees the rate of return to an additional year of education was 42.3% (an average premium of $5624) when estimated without an ability measure in the equation. Placing AFQT in the model lowered the rate of return of an additional year of education to 9.1%, a decline of 78%. Inserting ABIL into the equation reduced the effect of education to 11.5%, a reduction of 73%. On average, the AFQT model estimates the premium for additional schooling for this subgroup to be $1,210. For this higher education subgroup, omission of an ability measure from the regression equation significantly increases the rate of return to additional schooling.

b. High School Graduates and Below

For this subgroup, omitting an ability measure in the model resulted in an estimation of a rate of return to an additional year of education of 11.1%, which equates to an average income premium of $1,476. By including AFQT in the equation, this rate of return declined to 7.3%, a reduction of 34%. Placing ABIL in the model lowered the rate of return to 8.5%, a decline of 23%. The AFQT model reduced the estimated return for an additional year of education for this subgroup to $971. For both education subsets, AFQT demonstrated greater utility as an ability proxy.

TABLE III

REGRESSION COEFFICIENTS FOR OCCUPATIONAL GROUPS

	Service		Sales		Technical	
Variables	AFQT	ABIL	AFQT	ABIL	AFQT	ABIL
AFQT	.002***	---	.002**	---	.005***	---
ABIL	---	.006***	---	.005	---	.002
EDUC	-.212**	-.208**	-.224	-.242	.496**	.646***
EDSQ	.010***	.010***	.010	.011*	-.016***	-.016***
EXP	.128***	.127***	.137***	.141***	.236***	.249***
EXPSQ	-.008***	-.008***	-.008*	-.009**	-.016***	-.016***
SEX	.148***	.177***	.298***	.334***	.257***	.263***
BLACK	-.022	-.044	-.134	-.174**	-.006	-.065**
OTHER	.024	-.006	-.100	-.121	-.085	-.122
MARSTA	.052	.051	.108*	.112*	.052	.079
REGION	-.040	-.041	-.073	-.086*	-.028	-.027
DEP	-.003	-.005	-.012	.021	-.001	-.021
OLF	-.063***	-.059***	-.021	-.013	-.025	-.023
UNEMP	-.073***	-.074***	-.002	.001	-.209***	-.207***
FARM	-.007	-.073	-.025	-.025	-.047	-.096
N	544		355		204	

* - significant at the .05 level.
** - significant at the .01 level.
*** - significant at the .001 level.

TABLE III (cont.)

REGRESSION COEFFICIENTS FOR
OCCUPATIONAL GROUPS

Variables	Clerical-Administrative AFQT	ABIL	Managerial-Professional AFQT	ABIL
AFQT	.005***	---	.005***	---
ABIL	---	.002	---	.002
EDUC	.496***	.646***	-.078	-.028
EDSQ	-.015*	-.019**	.004	.003
EXP	.236***	.249*	.128***	.134***
EXPSQ	-.016***	-.016**	-.008***	-.008***
SEX	.257***	.283***	.183***	.204***
BLACK	-.006	-.165	.027	-.064
OTHER	-.085	-.122	.024	-.044
MARSTA	.052	.079	.080*	.080*
REGION	-.028	-.027	-.003	-.015
DEP	.001	-.012	-.023	-.025
OLF	-.025	-.023	-.052*	-.064***
UNEMPL	-.209***	-.207***	-.077*	-.078*
FARM	-.047	-.096	-.141*	-.160*
N	844		565	

* - significant at the .05 level.
** - significant at the .01 level.
*** - significant at the .001 level.

3. Occupational Subgroups

Table II compares the returns to education for each occupational group and Table III contains the regression coefficients for each occupational group.

a. Technical Occupations

Estimating the model without an ability measure for individuals working in technical occupations yielded an effect to additional schooling of 24.3%. Using AFQT as an ability proxy, the rate of return declined to 8.1%, a reduction of 66%. Placing ABIL in the equation resulted in a rate of return of 12%, a decrease of 29%. AFQT provided a substantial decline in the effect of education, reducing the estimated education premium from $3,231 to $1,077.

b. Service Occupations

Omission of an ability measure resulted in a rate of return to education of 6.9%. Insertion of AFQT into the model yielded a 3.5% rate of return, a decline of 49%. Placing ABIL in the equation, the rate of return fell to 3.9%, a reduction of 44%. The AFQT model provided a large reduction in the education effect, decreasing the premium, on average, from $918 to $465.

c. Managerial-Professional Occupations

For individuals in managerial-professional occupations the model estimated the rate of return to additional schooling at 7.5%, when an ability measure is omitted from the equation. Entering AFQT into the model

yielded a rate of return of 3.7%, a decline of 51%. Placing ABIL in the equation resulted in a rate of return of 5.8%, a reduction of 23%. AFQT causes a substantial decline over ABIL, yielding a estimated premium for additional education of $492.

d. Clerical-Administrative Occupations

Estimating the model without an ability measure yielded a rate of return to additional schooling of 10.1% (an estimated premium of $1,343) for individuals in clerical-administrative occupations. Placing AFQT into the model resulted in reducing this rate of return by 35% to 6.6% (an estimated premium of $878). Entering ABIL into the equation lowered the rate of return to 7.8%, a reduction of 23%. For this subset, AFQT provides greater utility as an ability proxy than ABIL.

e. Sales Occupations

Omission of an ability measure in the model resulted in an estimation of the effect of additional schooling of 6.8% for individuals in sales occupations. Placing AFQT in the equation yielded a rate of return of 4.0%, a reduction of 41%. Entering ABIL in the model estimated a rate of return of 4.9%, a decrease of 28%. AFQT exhibits greater utility than ABIL for this subgroup, yielding an estimated premium of $532.

TABLE IV

REGRESSION COEFFICIENTS FOR
EDUCATIONAL GROUPS

Variables	Educ Class 1		Educ Class 2	
	AFQT	ABIL	AFQT	ABIL
AFQT	.002	---	.003***	---
ABIL	---	.002	---	.008***
EDUC	---	---	---	---
EDSQ	---	---	---	---
EXP	.008	.014	.135***	.137***
EXPSQ	.001	-.001	-.008***	-.008***
SEX	.237***	.247***	.229***	.254***
BLACK	-.047	-.068	-.026	-.059**
OTHER	.087	.071	.039	.003
MARSTA	.137	.138	.088***	.087***
REGION	-.049	-.057	-.054***	-.060***
DEP	-.047	-.049	-.018	-.020
OLF	-.004	-.005	-.025**	-.024*
UNEMPL	-.049*	-.052*	-.053***	-.054***
FARM	-.005	-.005	-.067***	-.069***
N	434		2162	

* - significant at the .05 level.
** - significant at the .01 level.
*** - significant at the .001 level.

TABLE IV (cont.)

REGRESSION COEFFICIENTS FOR
EDUCATIONAL GROUPS

Variables	Educ Class 3 AFQT	Educ Class 3 ABIL	Educ Class 4 AFQT	Educ Class 4 ABIL
AFQT	.002***	---	.005***	---
ABIL	---	.004	---	.006**
EDUC	---	---	---	---
EDSQ	---	---	---	---
EXP	.214***	.223***	.350***	.365***
EXPSQ	.062*	-.022***	-.052***	-.055***
SEX	.142***	.167***	.189***	.217***
BLACK	.014	-.028	.119*	.017
OTHER	-.082	-.099	-.052	-.135
MARSTA	.119**	.127***	.053	.048
REGION	-.006	-.010	.007	.004***
DEP	.019	.018	-.030	-.038
OLF	-.070***	-.070***	-.053*	-.065**
UNEMPL	-.062**	-.057***	-.148***	-.157***
FARM	-.179***	-.188***	-.109	-.149*
N	515		515	

* - significant at the .05 level.
** - significant at the .01 level.
*** - significant at the .001 level.

C. COMPARSION OF THE UTILITY OF THE ABILITY PROXIES

1. Educational Results

In this section, results are presented for more finely partitioned educational subgroups than in section B. By selecting more homogeneous educational categories, potential interrelationships of education and ability are more accurately controlled for, thereby permitting a sharper focus on the utility of the proxies to capture the effect of ability on income. For direct comparsions with the previously presented results, Table IV contains the unstandardized regression coefficients for each educational class. In this section, beta coefficients for the variables will be utilized to facilitate the comparsion of the effects of the ability constructs since the scales of the ability measures are not necessarily directly comparable. Since standardized (beta) coefficients measure the change in the dependent variable (measured in standard deviations) that results from a one standard deviation change in an independent variable, they provide a common scale, the standard deviation, permitting comparsions that would otherwise be inappropriate due to scaling differences. Table V presents the beta coefficients for the two ability measures for four educational subgroups. The results are from models without EDUC or EDSQ among the explanatory variables. When attempts were made to include these measures, they were either insignificant or below tolerance requirements for inclusion in the regression

TABLE V

BETA COEFFICIENTS FOR ALTERNATIVE
ABILITY MEASURES FOR EDUCATIONAL GROUPS

Educational Groups	AFQT	ABIL
Less than a H.S. Diploma (N=434)	.098	.038
H.S. Graduate but Less Than 2 Yrs of College (N=2162)	.181	.152
More Than 2 Yrs of College but Less Than a 4 Yr Degree. (N=515)	.125	.061
B.S./ B.A. or Higher (N=515)	.220	.097

equation. If an independent variable fails to increase the explanatory power of the model (Rsquare) by the specified value (for this thesis, the minimum tolerance was .001), the variable is omitted from the regression.

a. Education Class 1

This education subgroup consists of individuals who do not have a high school diploma. Estimating the AFQT model for this subgroup yielded a beta coefficient of .096, which was significant at the .06 level. The Rsquare for the AFQT equation was .179. The beta coefficient for ABIL was .038 and was not significant at the .10 level. This model achieved an Rsquare of .172. The AFQT equation provides a small (4%) increase in explanatory power. These results indicate that AFQT offers somewhat greater utility as an ability measure than ABIL for individuals without a high school diploma.

b. Education Class 2

This subgroup consists of those individuals who have a high school diploma but less than two years of college. For this class, both ability proxies were significant at the .0001 level. A beta coefficient of .181 was estimated for AFQT and .152 for ABIL. Hence, a one standard deviation increase in ability was associated with an 18.1% of a standard deviation increase in the log of income for AFQT and a 15.2% increase in the log of income for ABIL. Rsquare for the AFQT equation was .266 while the ABIL model was .259. For individuals with a

high school diploma but less than two years of college, both measures of ability were useful for explaining differences in income with AFQT providing slightly greater utility as an ability proxy.

c. Education Class 3

This class consists of individuals who have completed at least two years of college but do not have a four year degree. For this subgroup, AFQT was significant at the .01 level with a beta coefficient of .125. The beta coefficient for ABIL was .061 but it was not significant at the .10 level. Rsquare for the AFQT model was .286 while the ABIL model was .278. These results suggest that AFQT acts as a more effective ability measure for individuals with more than two years of college but less than a four year degree.

d. Education Class 4

This subgroup consists of those individuals who have a four year degree or higher. For this class, each ability proxy was significant at the .05 level. The beta coefficient for AFQT was .22 while ABIL was .097. The AFQT model achieved a Rsquare of .272 while the ABIL model had a Rsquare of .244. These results indicate that AFQT provides greater utility as an ability measure for individuals who have at least a four year college degree.

2. Occupational Results by Education Class

To further focus in on the utility of the alternative ability measures the model was estimated for occupational

TABLE VI

REGRESSION COEFFICIENTS FOR
OCCUPATIONAL AND EDUCATIONAL GROUPS

	Educ Class 2/ Sales		Educ Class 2/ Service	
Variables	AFQT	ABIL	AFQT	ABIL
AFQT	.003**	---	.002***	---
ABIL	---	.006*	---	.006**
EDUC	---	---	---	---
EDSQ	---	---	---	---
EXP	.109*	.094	.106	.106**
EXPSQ	-.007	-.005	-.006	-.006
SEX	.362***	.413***	.129***	.160***
BLACK	-.176*	-.199*	-.044	-.068
OTHER	.033	.041	-.147	-.175
MARSTA	.069	.075	.042	.039
REGION	-.033	-.049	-.039	-.031
DEP	-.005	-.019	-.008	-.008
OLF	-.029	-.013	-.045*	-.036
UNEMPL	.013	.023	-.048	-.051*
FARM	.022	.015	-.106	-.102
N	194		349	

* - significant at the .05 level.
** - significant at the .01 level.
*** - significant at the .001 level.

TABLE VI (cont.)

REGRESSION COEFFICIENTS FOR
OCCUPATIONAL AND EDUCATIONAL GROUPS

	Educ Class 2/ Clerical-Administrative		Educ Class 4/ Managerial-Professional	
Variables	AFQT	ABIL	AFQT	ABIL
AFQT	.002***	---	.007***	---
ABIL	---	.005***	---	.012*
EDUC	---	---	---	---
EDSQ	---	---	---	---
EXP	.146***	.148***	.319***	.338***
EXPSQ	-.011***	-.011***	-.054***	-.058***
SEX	.127***	.147***	.255***	.310***
BLACK	.040	.015	.180*	.134
OTHER	.066	.029	.038	-.036
MARSTA	.050	.045	.019	.016
REGION	-.077***	-.085***	-.038	-.035
DEP	-.001	.006	-.079	-.103
OLF	-.001***	-.005	-.060	-.083*
UNEMPL	-.064***	-.063***	-.163**	-.164**
FARM	-.108**	-.104*	-.079	-.135
N	578		267	

* - significant at the .05 level.
** - significant at the .01 level.
*** - significant at the .001 level.

TABLE VII

BETA COEFFICIENTS FOR ALTERNATIVE ABILITY MEASURES FOR OCCUPATIONAL GROUPS BY EDUCATION CLASS

H.S. Graduates but Less Than 2 Yrs of College	AFQT	ABIL
Clerical-Administrative (N=578)	.143	.119
Sales (N=194)	.185	.147
Service (N=349)	.153	.149
B.S./ B.A. or Higher		
Managerial-Professional (N=267)	.247	.194

groups within the education classes. This phase of the analysis was limited since model estimates were confined to subsamples which yielded at least one hundred observations. Four subsamples met this sample size criteria: clerical-administrative/education class 2, sales occupations/education class 2, service occupations/education class 2, and managerial-professional occupations/education class 4. Table VI contains the unstandardized regression coefficients for each of these occupation/education classes and Table VII presents the associated beta coefficients.

a. Education Class 2

(1) Clerical-Administrative Occupations. For this subset, the beta coefficient for AFQT was .143 and was significant at the .001 level. The beta coefficient for ABIL was .119 and it was significant at the .01 level. Hence, a one standard deviation increase in ability is associated with a 14.3% increase of a standard deviation in the log of income for the AFQT and a 11.9% increase for ABIL. The Rsquare for the AFQT model was .212 while the Rsquare for the ABIL model was .208, a difference of 2% in explanatory power. For this subset, AFQT provides slightly greater utility as an ability measure.

(2) Sales Occupations. The beta coefficient for AFQT was .185 and was significant at the .001 level. The beta coefficient for ABIL was .119 and was significant at the .01 level. The Rsquare for the AFQT model was .382 while the ABIL

model yielded a Rsquare of .373, a difference of 2% in explanatory power. These results suggest that AFQT acts as a more effective proxy for individuals in sales occupations.

(3) Service Occupations. The beta coefficient of the AFQT variable was .153 and was significant at the .01 level. The beta coefficient for ABIL was .149 and was significant at the .01 level. There was no significant difference between the Rsquare for each model in this subgroup. This indicates that AFQT provides slightly greater utility for individuals in service occupations.

b. Education Class 4

(1) Managerial-ProfessionalOccupations. The beta coefficient for AFQT was .247 and it was significant at the .001 level. The beta coefficient for ABIL was .195 and was significant at the .01 level. Rsquare for the AFQT model was .285 and it was .256 for the ABIL model, a difference of 10% in explanatory power. This suggests that AFQT serves as a more effective measure than ABIL for individuals in managerial-professional occupations.

IV. CONCLUSIONS AND RECOMMENDATIONS

A number of conclusions can be drawn from this thesis. The first is that the inclusion of an ability measure in human capital earnings functions can substantially reduce the estimates of the returns from education.

The second conclusion is that AFQT appears to be a good candidate for a measure of ability. AFQT maintained a consistently high significance throughout the models estimated in chapter three. The effects of AFQT are consistently more significant than those in the Griliches and Mason study [Ref. 3]. These results may be due to age differences. Differences in abilities may account for more variation in income for new labor force participants than for more mature workers. The sample used by Griliches and Mason was in the age range 24 - 42 in 1972 when the study was conducted.

The third conclusion of this project is that the ASVAB subtest, Coding Speed, also seems to function as a good ability measure. Like AFQT, its effect on earnings was small but it remained significant for the majority of subgroups analyzed. This finding suggests that ASVAB component subtest, Coding Speed, may offer utility as an ability proxy and serve an expanded role in recruit eligibility, testing, and placement.

It is strongly recommended that research continue in this area with the current ASVAB forms 11, 12, and 13. One question

of interest is: Does the demonstrated potential of AFQT and Coding Speed as ability measures continue as this sample matures? This is a genuine concern since this model has been estimated for <u>early</u> labor force earnings.

The results of this analysis indicate that education and the ability constructs have a similiar impact on earnings. It may be that these ability constructs are really a mixture of measures of education and measures of innate ability. Further research is needed to be able to satisfactorily conclude that these constructs are indeed relatively pure measures of innate ability.

The resolution of this issue is important to the military. AFQT has long been used to predict a perspective recruit's "trainability" and subsequently to determine enlistment eligibility. As a selection criteria, it has been argured that AFQT is primarily an education measure since it is composed of subtests which are heavily dependent on acquired verbal and math skills. Although the results of this thesis tend to refute this claim, futher research is required before a definitive judgment can be made. If the military is going to meet its manpower requirements into the next century, it is essential that the selection process can effectively identify those individuals who are and are not "trainable". A true measure of innate ability would be invaluable in achieving that goal.

APPENDIX A

ASVAB FORM 8A SUBTESTS

General Science (20 items, 11 minutes). Items are drawn from biology, medicine, chemistry, and physics. This test measures basic factual knowledge at a level appropriate to secondary school general science courses.

Arithmetic Reasoning (30 items, 36 minutes). Often called "word problems." The items in this subtest require the subjects to solve problems described in short passages. Advanced mathematics is not required.

Word Knowledge (35 items, 11 minutes). Essentially a vocabulary test. The subject is given a word and asked to choose which of four other words is closest in meaning.

Paragraph Comprehension (15 items, 13 minutes). Designed to measure how well subjects can acquire information from written passages. Subjects are required to read short passages and answer questions about them.

Numerical Operations (50 items, 3 minutes). This covers basic arithmetic operations, which subjects are asked to solve as quickly as possible. Scores depend to a great extent on speed and accuracy.

Coding Speed (84 items, 7 minutes). Like numerical operations, this subtest emphasizes speed and accuracy. Given the code numbers for certain words at the top of the page in the test booklet, subjects are asked to mark spaces on their answer

sheet corresponding to the code numbers of the words.

Auto & Shop Information (25 items, 11 minutes). This subtest measures subject's specific knowledge of the tools and terms associated with the repair and maintenance of vehicles.

Mathematics Knowledge (25 items, 24 minutes). The questions in this subtest concern subjects that are normally taught in high school classes such as algebra, geometry, and trigonometry.

Mechanical Comprehension (25 items, 19 minutes). Items in this subtest showed pictures related to basic machines such as pulleys, levers, gears, and wedges; to answer the questions, subjects had to visualize how the pictured objects would operate.

Electronics Information (20 items, 9 minutes). This subtest measures the subjects' familiarity with electrical equipment, knowledge of electronics terminology, and ability to solve simple electrical problems.

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source: [Ref. 10]

APPENDIX B

SUMMARY STATISTICS

TABLE I

SUMMARY STATISTICS FOR AGGREGATE SAMPLE

Variable	N	N Missing	Mean	Min	Max
AFQT	3757	138	45.99	1	99
ABIL	3757	138	49.04	22	72
EDUC	3895	0	12.73	3	20
EDSQ	3895	0	166.03	9	400
EXP	3887	8	4.66	0	14
EXPSQ	3887	8	27.88	0	196
SEX	3895	0	.543	0	1
BLACK	3876	19	.187	0	1
OTHER	3876	19	.048	0	1
MARSTA	3894	1	.373	0	1
REGION	3846	49	.382	0	1
DEP	3889	6	.409	0	7
OLF	3875	20	.278	0	4
UNEMPL	3875	20	.195	0	4
FARM	3828	67	.132	0	1
INC83	3895	0	13295.28	5000	75001

TABLE II

SUMMARY STATISTICS FOR COLLEGE ATTENDEES

Variable	N	N Missing	Mean	Min	Max
AFQT	1090	23	63.83	1	99
ABIL	1090	23	52.99	12	72
EDUC	1113	0	14.86	12	20
EDSQ	1113	0	233.03	144	400
EXP	1107	6	3.17	0	9
EXPSQ	1107	6	13.78	0	81
SEX	1113	0	.476	0	1
BLACK	1106	7	.170	0	1
OTHER	1106	7	.036	0	1
MARSTA	1113	0	.332	0	1
REGION	1107	6	.390	0	1
DEP	1112	1	.204	0	4
OLF	1108	5	.343	0	4
UNEMPL	1108	5	.132	0	4
FARM	1096	17	.091	0	1
INC83	1113	0	14538.11	5000	75001

TABLE III

SUMMARY STATISTICS FOR HIGH SCHOOL GRADUATES AND BELOW

Variable	N	N Missing	Mean	Min	Max
AFQT	2283	103	36.14	1	99
ABIL	2283	103	46.67	22	72
EDUC	2386	0	11.51	3	12
EDSQ	2386	0	133.97	9	144
EXP	2386	0	5.50	1	14
EXPSQ	2386	0	35.96	1	196
SEX	2386	0	.593	0	1
BLACK	2377	9	.191	0	1
OTHER	2377	9	.055	0	1
MARSTA	2385	1	.399	0	1
REGION	2345	41	.380	0	1
DEP	2382	4	.523	0	7
OLF	2372	14	.245	0	4
UNEMPL	2372	14	.237	0	4
FARM	2344	42	.159	0	1
INC83	2386	0	12517.69	5000	75001

TABLE IV

SUMMARY STATISTICS FOR TECHNICAL OCCUPATIONS

Variable	N	N Missing	Mean	Min	Max
AFQT	210	6	63.61	2	99
ABIL	210	6	52.21	25	72
EDUC	216	0	13.87	9	19
EDSQ	216	0	196.31	81	361
EXP	215	1	4.17	0	10
EXPSQ	215	1	22.35	0	100
SEX	216	0	.491	0	1
BLACK	215	1	.158	0	1
OTHER	215	1	.042	0	1
MARSTA	216	0	.324	0	1
REGION	216	0	.361	0	1
DEP	215	1	.298	0	4
OLF	215	1	.233	0	4
UNEMPL	215	1	.079	0	4
FARM	213	3	.075	0	1
INC83	216	0	16366.64	5000	75001

TABLE V

SUMMARY STATISTICS FOR
MANAGERIAL-PROFESSIONAL OCCUPATIONS

Variable	N	N Missing	Mean	Min	Max
AFQT	590	10	61.78	1	99
ABIL	590	10	53.03	22	72
EDUC	600	0	14.35	6	20
EDSQ	600	0	210.32	36	400
EXP	598	2	3.89	0	12
EXPSQ	598	2	20.17	0	144
SEX	600	0	.438	0	1
BLACK	598	2	.156	0	1
OTHER	598	2	.043	0	1
MARSTA	600	0	.377	0	1
REGION	592	8	.370	0	1
DEP	599	1	.284	0	4
OLF	600	0	.255	0	4
UNEMPL	600	0	.103	0	4
FARM	585	15	.072	0	1
INC83	600	0	16501.42	5000	75001

TABLE VI

SUMMARY STATISTICS FOR SERVICE OCCUPATIONS

Variable	N	N Missing	Mean	Min	Max
AFQT	568	26	38.11	1	99
ABIL	568	26	[illegible]	22	72
EDUC	594	0	12.38	3	19
EDSQ	594	0	156.33	9	361
EXP	591	3	4.80	0	14
EXPSQ	591	3	28.86	0	196
SEX	594	0	.534	0	1
BLACK	590	4	.264	0	1
OTHER	590	4	.042	0	1
MARSTA	594	0	.298	0	1
REGION	591	3	.343	0	1
DEP	594	0	.449	0	5
OLF	588	6	.320	0	4
UNEMPL	588	6	.190	0	4
FARM	581	13	.108	0	1
INC83	594	0	10906.39	5000	50000

TABLE VII

SUMMARY STATISTICS FOR
CLERICAL-ADMINISTRATIVE OCCUPATIONS

Variable	N	N Missing	Mean	Min	Max
AFQT	878	35	48.33	1	99
ABIL	878	35	51.78	23	72
EDUC	908	5	12.83	6	18
EDSQ	908	5	166.86	36	324
EXP	911	2	4.36	0	13
EXPSQ	911	2	24.04	0	169
SEX	913	0	.269	0	1
BLACK	907	6	.192	0	1
OTHER	907	6	.053	0	1
MARSTA	912	1	.374	0	1
REGION	900	13	.371	0	1
DEP	912	1	.319	0	5
OLF	908	5	.292	0	4
UNEMPL	908	5	.137	0	4
FARM	900	13	.109	0	1
INC83	913	0	11938.01	5000	75001

TABLE VIII

SUMMARY STATISTICS FOR SALES OCCUPATIONS

Variable	N	N Missing	Mean	Min	Max
AFQT	359	10	51.24	1	99
ABIL	359	10	50.31	23	69
EDUC	369	0	13.18	7	17
EDSQ	369	0	176.93	49	289
EXP	369	0	4.05	0	12
EXPSQ	369	0	21.91	0	144
SEX	369	0	.442	0	1
BLACK	366	3	.128	0	1
OTHER	366	3	.052	0	1
MARSTA	369	0	.350	0	1
REGION	366	3	.399	0	1
DEP	368	1	.342	0	4
OLF	367	2	.294	0	4
UNEMPL	367	2	.158	0	4
FARM	363	6	.124	0	1
INC83	369	0	12674.62	5000	50000

TABLE IX

SUMMARY STATISTICS FOR EDUCATION CLASS 1

Variable	N	N Missing	Mean	Min	Max
AFQT	413	21	17.06	1	99
ABIL	413	21	[illegible]	22	[illegible]
EDUC	--	--	--	--	--
EDSQ	--	--	--	--	--
EXP	434	0	7.27	2	14
EXPSQ	434	0	59.93	4	196
SEX	434	0	.776	0	1
BLACK	432	2	.178	0	1
OTHER	432	2	.095	0	1
MARSTA	433	1	.411	0	1
REGION	421	13	.451	0	1
DEP	431	3	.794	0	7
OLF	429	5	.270	0	4
UNEMPL	429	5	.301	0	4
FARM	425	9	.174	0	1
INC83	434	0	11251.97	5000	37500

TABLE X

SUMMARY STATISTICS FOR EDUCATION CLASS 2

Variable	N	N Missing	Mean	Min	Max
AFQT	2239	95	42.22	1	99
[illegible]	2239	95	-6.68	22	72
EDUC	--	--	--	--	--
EDSQ	--	--	--	--	--
EXP	2334	0	4.96	0	9
EXPSQ	2334	0	29.21	0	81
SEX	2334	0	.539	0	1
BLACK	2326	8	.190	0	1
OTHER	2326	8	.046	0	1
MARSTA	2334	0	.383	0	1
REGION	2306	28	.368	0	1
DEP	2332	2	.436	0	5
OLF	2324	10	.252	0	4
UNEMPL	2324	10	.205	0	4
FARM	2296	38	.145	0	1
INC83	2334	0	12832.55	5000	75001

TABLE XI

SUMMARY STATISTICS FOR EDUCATION CLASS 3

Variable	N	N Missing	Mean	Min	Max
AFQT	533	13	56.76	1	99
ABIL	533	13	52.02	23	72
EDUC	--	--	--	--	--
EDSQ	--	--	--	--	--
EXP	543	3	3.41	0	7
EXPSQ	543	3	15.40	0	49
SEX	546	0	.452	0	1
BLACK	541	5	.224	0	1
OTHER	541	5	.052	0	1
MARSTA	546	0	.300	0	1
REGION	545	1	.387	0	1
DEP	546	0	.255	0	5
OLF	544	2	.432	0	4
UNEMPL	544	2	.173	0	4
FARM	537	9	.095	0	1
INC83	546	0	13266.38	5000	75001

TABLE XII

SUMMARY STATISTICS FOR EDUCATION CLASS 4

Variable	N	N Missing	Mean	Min	Max
AFQT	542	9	74.54	12	99
ABIL	542	9	55.02	25	72
EDUC	--	--	--	--	--
EDSQ	--	--	--	--	--
EXP	546	5	2.56	0	5
EXPSQ	546	5	8.18	0	25
SEX	551	0	.454	0	1
BLACK	547	4	.135	0	1
OTHER	547	4	.022	0	1
MARSTA	551	0	.370	0	1
REGION	544	7	.388	0	1
DEP	550	1	.142	0	3
OLF	548	3	.243	0	4
UNEMPL	548	3	.100	0	4
FARM	540	11	.081	0	1
INC83	551	0	16897.34	5000	75001

TABLE XIII

SUMMARY STATISTICS FOR
EDUCATION CLASS 2/ SALES OCCUPATIONS

Variable	N	N Missing	Mean	Min	Max
AFQT	207	7	47.35	1	99
ABIL	207	7	50.15	29	65
EDUC	--	--	--	--	--
EDSQ	--	--	--	--	--
EXP	209	0	4.69	0	9
EXPSQ	209	0	26.75	0	81
SEX	209	0	.416	0	1
BLACK	207	2	.145	0	1
OTHER	207	2	.034	0	1
MARSTA	209	0	.378	0	1
REGION	208	1	.385	0	1
DEP	208	1	.409	0	3
OLF	207	2	.251	0	4
UNEMPL	207	2	.092	0	4
FARM	207	2	.145	0	1
INC83	209	0	11952.13	5000	50000

TABLE XIV

SUMMARY STATISTICS FOR
EDUCATION CLASS 2/ CLERICAL-ADMINISTRATIVE OCCUPATIONS

Variable	N	N Missing	Mean	Min	Max
AFQT	601	25	44.53	22	61
ABIL	601	25	51.26	24	72
EDUC	--	--	--	--	--
EDSQ	--	--	--	--	--
EXP	626	0	4.79	0	9
EXPSQ	626	0	27.53	0	81
SEX	626	0	.238	0	1
BLACK	623	3	.183	0	1
OTHER	623	3	.051	0	1
MARSTA	626	0	.382	0	1
REGION	615	11	.364	0	1
DEP	626	0	.343	0	4
OLF	623	3	.257	0	4
UNEMPL	623	3	.127	0	4
FARM	616	10	.109	0	1
INC83	626	0	11742.38	5000	30000

TABLE XV

SUMMARY STATISTICS FOR
EDUCATION CLASS 2/ SERVICE OCCUPATIONS

Variable	N	N Missing	Mean	Min	Max
AFQT	362	19	35.85	1	99
ABIL	362	19	46.47	22	72
EDUC	--	--	--	--	--
EDSQ	--	--	--	--	--
EXP	381	0	4.82	0	9
EXPSQ	381	0	27.79	0	81
SEX	381	0	.504	0	1
BLACK	380	1	.253	0	1
OTHER	380	1	.039	0	1
MARSTA	381	0	.299	0	1
REGION	379	2	.343	0	1
DEP	381	1	.404	0	4
OLF	378	3	.307	0	4
UNEMPL	378	3	.206	0	4
FARM	372	9	.124	0	1
INC83	381	0	10658.21	5000	50000

TABLE XVI

SUMMARY STATISTICS FOR
EDUCATION CLASS 4/ MANAGERIAL-PROFESSIONAL OCCUPATIONS

Variable	N	N Missing	Mean	Min	Max
AFQT	263	3	74.90	14	99
ABIL	263	3	55.45	29	72
EDUC	--	--	--	--	--
EDSQ	--	--	--	--	--
EXP	265	2	2.63	0	5
EXPSQ	265	2	8.64	0	25
SEX	267	0	.412	0	1
BLACK	266	1	.135	0	1
OTHER	266	1	.026	0	1
MARSTA	267	0	.382	0	1
REGION	262	5	.385	0	1
DEP	267	0	.105	0	2
OLF	267	0	.228	0	4
UNEMPL	267	0	.067	0	4
FARM	261	6	.065	0	1
INC83	267	0	18129.11	5000	75001

APPENDIX C

ADJUSTED COEFFICIENTS FOR DICHOTOMOUS VARIABLES

TABLE I

AGGREGATE SAMPLE

Variable	AFQT Model Unadjusted Coefficient	AFQT Model Adjusted Coefficient	ABIL Model Unadjusted Coefficient	ABIL Model Adjusted Coefficient
SEX	.205	.229	.233	.262
BLACK	-.007	-.007	-.052	-.051
OTHER	.034	.035	-.0008	-.0008
MARSTA	.096	.101	.096	.101
REGION	-.043	-.042	-.051	-.050
FARM	-.067	-.065	-.070	-.068
N	3608			

TABLE II

COLLEGE ATTENDEES

Variable	AFQT Model Unadjusted Coefficient	AFQT Model Adjusted Coefficient	ABIL Model Unadjusted Coefficient	ABIL Model Adjusted Coefficient
SEX	.148	.160	.175	.191
BLACK	.048	.049	-.017	-.017
OTHER	-.105	-.099	-.140	-.131
MARSTA	.094	.098	.100	.105
REGION	-.014	-.014	-.019	-.019
FARM	-.141	-.132	-.161	-.148
N	1053			

TABLE III

HIGH SCHOOL GRADUATES AND BELOW

Variable	AFQT Model Unadjusted Coefficient	AFQT Model Adjusted Coefficient	ABIL Model Unadjusted Coefficient	ABIL Model Adjusted Coefficient
SEX	.248	.281	.279	.322
BLACK	-.046	-.045	-.083	-.080
OTHER	.070	.073	.033	.034
MARSTA	.092	.096	.089	.093
REGION	-.049	-.048	-.058	-.056
FARM	-.040	-.039	-.041	-.040
N	2187			

TABLE IV

TECHNICAL OCCUPATIONS

	AFQT Model		ABIL Model	
Variable	Unadjusted Coefficient	Adjusted Coefficient	Unadjusted Coefficient	Adjusted Coefficient
SEX	.257	.293	.284	.328
BLACK	-.007	-.007	-.166	-.153
OTHER	.086	.090	-.122	-.115
MARSTA	.052	.053	.080	.083
REGION	-.029	-.029	-.027	-.026
FARM	-.048	-.047	-.096	-.092
N	204			

TABLE V

MANAGERIAL-PROFESSIONAL OCCUPATIONS

Variable	AFQT Model Unadjusted Coefficient	AFQT Model Adjusted Coefficient	ABIL Model Unadjusted Coefficient	ABIL Model Adjusted Coefficient
SEX	.183	.201	.205	.227
BLACK	.027	.027	-.065	-.063
OTHER	.024	.024	-.049	-.048
MARSTA	.080	.083	.088	.092
REGION	-.004	-.004	.016	.016
FARM	-.141	-.131	-.161	-.149
N	565			

TABLE VI

SERVICE OCCUPATIONS

	AFQT Model		ABIL Model	
Variable	Unadjusted Coefficient	Adjusted Coefficient	Unadjusted Coefficient	Adjusted Coefficient
SEX	.149	.161	.178	.195
BLACK	-.023	-.023	-.044	-.045
OTHER	.024	.024	-.006	-.006
MARSTA	.052	.053	.052	.053
REGION	-.041	-.040	-.042	-.041
FARM	-.078	-.075	-.073	-.070
N	544			

TABLE VII

CLERICAL-ADMINISTRATIVE OCCUPATIONS

Variable	AFQT Model Unadjusted Coefficient	AFQT Model Adjusted Coefficient	ABIL Model Unadjusted Coefficient	ABIL Model Adjusted Coefficient
SEX	.117	.124	.131	.140
BLACK	-.014	-.013	-.035	-.034
OTHER	-.048	-.047	.027	.027
MARSTA	.037	.038	.034	.035
REGION	-.044	-.043	-.048	-.047
FARM	-.111	-.105	-.113	-.107
N	844			

TABLE VIII

SALES OCCUPATIONS

Variable	AFQT Model Unadjusted Coefficient	AFQT Model Adjusted Coefficient	ABIL Model Unadjusted Coefficient	ABIL Model Adjusted Coefficient
SEX	.298	.347	.334	.397
BLACK	-.134	-.125	-.174	-.160
OTHER	-.100	-.095	-.121	-.114
MARSTA	.108	.114	.112	.119
REGION	-.073	-.070	-.086	-.082
FARM	-.025	-.025	-.025	-.025
N	355			

TABLE IX

EDUCATION CLASS 1

	AFQT Model		ABIL Model	
Variable	Unadjusted Coefficient	Adjusted Coefficient	Unadjusted Coefficient	Adjusted Coefficient
SEX	.247	.280	.236	.266
BLACK	-.068	-.066	-.047	-.046
OTHER	.071	.074	.087	.091
MARSTA	.138	.148	.137	.147
REGION	-.058	-.056	.050	.051
FARM	.005	.005	.005	.005
N	434			

TABLE X

EDUCATION CLASS 2

	AFQT Model		ABIL Model	
Variable	Unadjusted Coefficient	Adjusted Coefficient	Unadjusted Coefficient	Adjusted Coefficient
SEX	.229	.257	.263	.301
BLACK	-.026	-.026	-.059	-.057
OTHER	.039	.040	.003	.003
MARSTA	.088	.092	.087	.091
REGION	-.054	-.053	-.059	-.054
FARM	-.067	-.064	-.056	-.054
N	2162			

TABLE XI

EDUCATION CLASS 3

	AFQT Model		ABIL Model	
Variable	Unadjusted Coefficient	Adjusted Coefficient	Unadjusted Coefficient	Adjusted Coefficient
SEX	.142	.152	.167	.182
BLACK	.014	.014	-.028	-.028
OTHER	-.082	-.079	-.099	-.094
MARSTA	.119	.126	.127	.135
REGION	-.006	-.006	-.010	-.010
FARM	-.179	-.164	-.188	-.171
N	515			

TABLE VII

EDUCATION CLASS 4

	AFQT Model		ABIL Model	
Variable	Unadjusted Coefficient	Adjusted Coefficient	Unadjusted Coefficient	Adjusted Coefficient
SEX	.189	.208	.216	.241
BLACK	.119	.126	.017	.017
OTHER	-.052	-.051	-.135	-.126
MARSTA	.053	.054	.048	.049
REGION	.007	.007	.004	.004
FARM	-.109	-.103	-.149	-.138
N	515			

TABLE XIII

EDUCATION CLASS 2/ CLERICAL-ADMINISTRATIVE OCCUPATIONS

	AFQT Model		ABIL Model	
Variable	Unadjusted Coefficient	Adjusted Coefficient	Unadjusted Coefficient	Adjusted Coefficient
SEX	.126	.134	.147	.158
BLACK	.040	.041	.015	.015
OTHER	.065	.067	.029	.029
MARSTA	.049	.050	.044	.045
REGION	-.077	-.074	-.085	-.081
FARM	-.107	-.101	-.104	-.099
N	578			

TABLE XIV

EDUCATION CLASS 2/ SALES OCCUPATIONS

	AFQT Model		ABIL Model	
Variable	Unadjusted Coefficient	Adjusted Coefficient	Unadjusted Coefficient	Adjusted Coefficient
SEX	.362	.436	.413	.511
BLACK	-.176	-.161	-.199	-.180
OTHER	.031	.031	.040	.041
MARSTA	.069	.071	.075	.078
REGION	-.033	-.032	-.040	-.039
FARM	.021	.021	.015	.015
N	194			

TABLE XV

EDUCATION CLASS 2/ SERVICE OCCUPATIONS

Variable	AFQT Model Unadjusted Coefficient	AFQT Model Adjusted Coefficient	ABIL Model Unadjusted Coefficient	ABIL Model Adjusted Coefficient
SEX	.129	.138	.160	.173
BLACK	-.044	-.043	-.068	-.065
OTHER	-.147	-.137	-.174	-.159
MARSTA	.041	.042	.039	.040
REGION	-.039	-.038	-.031	-.030
FARM	-.105	-.099	-.101	-.096
N	349			

TABLE XVI

EDUCATION CLASS 4/ MANAGERIAL-PROFESSIONAL OCCUPATIONS

	AFQT Model		ABIL Model	
Variable	Unadjusted Coefficient	Adjusted Coefficient	Unadjusted Coefficient	Adjusted Coefficient
SEX	.254	.289	.310	.363
BLACK	.180	.197	.134	.143
OTHER	.038	.039	-.101	-.096
MARSTA	.019	.019	.015	.015
REGION	.038	.039	.035	.036
FARM	-.085	-.082	-.135	-.126
N	267			

APPENDIX D

REGRESSION COEFFICIENTS

TABLE I

REGRESSION COEFFICIENTS AND BETA COEFFICIENTS FOR AGGREGATE SAMPLE

	AFQT Model			ABIL Model		
Variable	b	beta	(sig)	b	beta	(sig)
AFQT	.003	.205	(.00)	--	--	--
ABIL	--	--	--	.005	.122	(.00)
EDUC	-.049	-.215	(.09)	-.050	-.218	(.09)
EDSQ	.004	.476	(.00)	.005	.552	(.00)
EXP	.128	.700	(.00)	.131	.718	(.00)
EXPSQ	-.007	-.422	(.00)	-.007	-.426	(.00)
SEX	.206	.229	(.00)	.233	.258	(.00)
BLACK	-.007	-.006	(.71)	-.052	-.045	(.00)
OTHER	.033	.016	(.27)	-.001	-.001	(.98)
MARSTA	.095	.103	(.00)	.095	.102	(.00)
REGION	-.043	-.047	(.00)	-.050	-.055	(.00)
DEP	-.003	-.006	(.67)	-.005	-.009	(.54)
OLF	-.039	-.075	(.00)	-.039	-.074	(.00)
UNEMPL	-.058	-.092	(.00)	-.058	-.092	(.00)
FARM	-.066	-.050	(.00)	-.070	-.053	(.00)
N = 3608						
Rsquare	.269			.257		
Durbin-Watson	1.92905			1.91903		

TABLE II

REGRESSION COEFFICIENTS AND BETA COEFFICIENTS FOR COLLEGE ATTENDEES

	AFQT Model			ABIL Model		
Variable	b	beta	(sig)	b	beta	(sig)
AFQT	.002	.172	(.00)	--	--	--
ABIL	--	--	--	.004	.081	(.01)
EDUC	.210	-.623	(.16)	.234	.695	(.12)
EDSQ	-.004	-.411	(.36)	-.004	-.434	(.33)
EXP	.190	.760	(.00)	.192	.767	(.00)
EXPSQ	-.015	-.450	(.00)	-.015	-.461	(.00)
SEX	.148	.152	(.00)	.174	.179	(.00)
BLACK	.048	.037	(.22)	-.016	-.013	(.64)
OTHER	-.105	-.139	(.14)	-.140	-.052	(.05)
MARSTA	.093	.090	(.00)	.100	.097	(.00)
REGION	-.013	-.013	(.60)	-.019	-.019	(.48)
DEP	.023	.026	(.37)	.021	.023	(.42)
OLF	-.058	-.113	(.00)	-.060	-.117	(.00)
UNEMPL	-.093	-.113	(.00)	-.089	-.109	(.00)
FARM	-.141	-.085	(.00)	-.016	-.096	(.00)

N = 1053

	AFQT Model	ABIL Model
Rsquare	.299	.286
Durbin-Watson	2.02710	2.04023

TABLE III

REGRESSION COEFFICIENTS AND BETA COEFFICIENTS FOR HIGH SCHOOL GRADUATES AND BELOW

	AFQT Model			ABIL Model		
Variable	b	beta	(sig)	b	beta	(sig)
AFQT	.003	.200	(.00)	--	--	--
ABIL	--	--	--	.006	.145	(.00)
EDUC	-.135	-.365	(.06)	-.169	-.456	(.02)
EDSQ	.009	.503	(.01)	.011	.621	(.00)
EXP	.093	.527	(.00)	.096	.543	(.00)
EXPSQ	-.004	-.283	(.00)	-.004	-.289	(.00)
SEX	.248	.291	(.00)	.278	.327	(.00)
BLACK	-.046	-.043	(.04)	-.083	-.077	(.00)
OTHER	.069	.038	(.05)	.032	.018	(.35)
MARSTA	.091	.106	(.00)	.088	.103	(.00)
REGION	-.048	-.056	(.00)	-.057	-.066	(.00)
DEP	-.001	-.002	(.89)	-.002	-.005	(.78)
OLF	-.023	-.045	(.01)	-.022	-.041	(.03)
UNEMPL	-.053	-.101	(.00)	-.056	-.105	(.00)
FARM	-.039	-.034	(.07)	-.040	-.035	(.07)

N = 2187

	AFQT Model	ABIL Model
Rsquare	.257	.245
Durbin-Watson	1.93781	1.93595

TABLE IV

REGRESSION COEFFICIENTS AND BETS COEFFICIENTS
FOR CLERICAL-ADMINISTRATIVE OCCUPATIONS

	AFQT Model			ABIL Model		
Variable	b	beta	(sig)	b	beta	(sig)
AFQT	.001	.101	(.01)	--	--	--
ABIL	--	--	--	.002	.067	(.05)
EDUC	.194	.785	(.04)	.181	.731	(.06)
EDSQ	-.005	-.531	(.16)	-.004	-.448	(.24)
EXP	.153	.922	(.00)	.155	.938	(.00)
EXPSQ	-.010	-.615	(.00)	-.011	-.625	(.00)
SEX	.117	.141	(.00)	.131	.157	(.00)
BLACK	-.014	-.015	(.67)	-.035	-.037	(.26)
OTHER	.047	.027	(.38)	.027	.016	(.61)
MARSTA	.036	.048	(.14)	.033	.044	(.18)
REGION	-.044	-.058	(.06)	-.048	-.063	(.05)
DEP	-.002	-.004	(.89)	-.000	-.000	(.99)
OLF	-.023	-.054	(.07)	-.025	-.058	(.06)
UNEMPL	-.053	-.089	(.00)	-.052	-.087	(.00)
FARM	-.111	-.094	(.00)	-.113	-.096	(.00)

N = 844

	AFQT Model	ABIL Model
Rsquare	.229	.226
Durbin-Watson	1.80316	1.79519

TABLE V

REGRESSION COEFFICIENTS AND BETA COEFFICIENTS
FOR MANAGERIAL-PROFESSIONAL OCCUPATIONS

Variable	AFQT Model b	AFQT Model beta	AFQT Model (sig)	ABIL Model b	ABIL Model beta	ABIL Model (sig)
AFQT	.004	.273	(.00)	--	--	--
ABIL	--	--	--	.003	.069	(.11)
EDUC	-.078	-.361	(.43)	-.028	-.130	(.78)
EDSQ	.004	.569	(.20)	.003	.037	(.39)
EXP	.128	.644	(.00)	.134	.671	(.00)
EXPSQ	-.008	-.395	(.00)	-.008	-.451	(.00)
SEX	.183	.200	(.00)	.204	.224	(.00)
BLACK	.027	.021	(.60)	-.064	-.051	(.22)
OTHER	.024	.011	(.77)	-.044	-.020	(.59)
MARSTA	.080	.086	(.03)	.088	.094	(.02)
REGION	-.003	-.004	(.91)	-.015	-.016	(.67)
DEP	-.023	-.035	(.40)	-.025	-.037	(.39)
OLF	-.052	-.093	(.02)	-.064	-.113	(.00)
UNEMPL	-.077	-.086	(.02)	-.078	-.088	(.02)
FARM	-.141	-.081	(.03)	-.160	-.093	(.02)

N = 565

	AFQT Model	ABIL Model
Rsquare	.266	.227
Durbin-Watson	2.00172	1.95149

TABLE VI

REGRESSION COEFFICIENTS AND BETA COEFFICIENTS FOR SERVICE OCCUPATIONS

	AFQT Model			ABIL Model		
Variable	b	beta	(sig)	b	beta	(sig)
AFQT	.002	.1[illegible]1	(.00)	--	--	--
ABIL	--	--	--	.006	.147	(.00)
EDUC	-.212	-.902	(.01)	-.208	-.883	(.01)
EDSQ	.010	.109	(.00)	.010	.109	(.00)
EXP	.128	.770	(.00)	.127	.760	(.00)
EXPSQ	-.008	-.579	(.00)	-.008	-.554	(.00)
SEX	.148	.183	(.00)	.177	.218	(.00)
BLACK	-.022	-.025	(.60)	-.044	-.048	(.28)
OTHER	.024	.012	(.76)	-.006	-.003	(.94)
MARSTA	.052	.058	(.17)	.051	.057	(.17)
REGION	-.040	-.047	(.25)	-.041	-.049	(.24)
DEP	-.003	-.008	(.84)	-.005	-.011	(.79)
OLF	-.063	-.140	(.00)	-.059	-.132	(.00)
UNEMPL	-.073	-.127	(.00)	-.074	-.129	(.00)
FARM	-.007	-.059	(.13)	-.073	-.056	(.15)

N = 544

	AFQT Model	ABIL Model
Rsquare	.227	.227
Durbin-Watson	1.92306	1.93087

TABLE VII

REGRESSION COEFFICIENTS AND BETA COEFFICIENTS
FOR TECHNICAL OCCUPATIONS

	AFQT Model			ABIL Model		
Variable	b	beta	(sig)	b	beta	(sig)
AFQT	.005	.315	(.00)	--	--	--
ABIL	--	--	--	.002	.045	(.47)
EDUC	.496	1.98	(.01)	.646	2.58	(.00)
EDSQ	-.016	-.675	(.00)	-.016	-.667	(.00)
EXP	.236	1.08	(.00)	.249	1.13	(.00)
EXPSQ	-.016	-.675	(.00)	-.016	-.667	(.00)
SEX	.257	.264	(.00)	.283	.291	(.00)
BLACK	-.006	-.005	(.94)	-.165	-.126	(.05)
OTHER	-.085	-.036	(.51)	-.122	-.051	(.37)
MARSTA	.052	.049	(.40)	.079	.076	(.22)
REGION	-.028	-.028	(.63)	-.027	-.026	(.66)
DEP	-.000	-.000	(.99)	-.012	-.017	(.78)
OLF	-.025	-.040	(.48)	-.023	-.036	(.53)
UNEMPL	-.209	-.208	(.00)	-.207	-.206	(.00)
FARM	-.047	-.026	(.64)	-.096	-.053	(.37)

N = 204

	AFQT Model	ABIL Model
Rsquare	.461	.412
Durbin-Watson	1.94013	1.92109

TABLE VIII

REGRESSION COEFFICIENTS AND BETA COEFFICIENTS FOR SALES OCCUPATIONS

	AFQT Model			ABIL Model		
Variable	b	beta	(sig)	b	beta	(sig)
AFQT	.002	.149	(.01)	--	--	--
ABIL	--	--	--	.005	.085	(.08)
EDUC	-.224	-.814	(.16)	-.242	-.881	(.13)
EDSQ	.010	.038	(.39)	.011	1.17	(.05)
EXP	.137	.669	(.00)	.141	.686	(.00)
EXPSQ	-.008	-.379	(.02)	-.009	-.395	(.01)
SEX	.298	.310	(.00)	.334	.348	(.00)
BLACK	-.134	-.094	(.06)	-.174	-.122	(.01)
OTHER	-.100	-.048	(.30)	-.121	-.058	(.21)
MARSTA	.108	.108	(.03)	.112	.112	(.03)
REGION	-.073	-.075	(.10)	-.086	-.088	(.05)
DEP	-.012	-.017	(.73)	.021	.029	(.56)
OLF	-.021	-.038	(.39)	-.013	-.024	(.59)
UNEMPL	-.002	-.003	(.93)	-.000	-.000	(.99)
FARM	-.025	-.018	(.69)	-.025	-.018	(.69)

N = 355

	AFQT Model	ABIL Model
Rsquare	.360	.353
Durbin-Watson	1.92306	1.93087

TABLE IX

REGRESSION COEFFICIENTS AND BETA COEFFICIENTS
FOR EDUCATION CLASS 1

	AFQT Model			ABIL Model		
Variable	b	beta	(sig)	b	beta	(sig)
AFQT	.002	.098	(.06)	--	--	--
ABIL	--	--	--	.002	.038	(.47)
EDUC	--	--	--	--	--	--
EDSQ	--	--	--	--	--	--
EXP	.008	.054	(.82)	.014	.097	(.68)
EXPSQ	.001	.025	(.92)	-.001	-.022	(.92)
SEX	.237	.253	(.00)	.247	.264	(.00)
BLACK	-.047	-.046	(.38)	-.068	-.067	(.20)
OTHER	.087	.067	(.19)	.071	.055	(.28)
MARSTA	.137	.170	(.00)	.138	.172	(.00)
REGION	-.049	-.063	(.24)	-.057	-.073	(.17)
DEP	-.047	-.138	(.00)	-.049	-.142	(.01)
OLF	-.004	-.009	(.84)	-.005	-.011	(.82)
UNEMPL	-.049	-.109	(.02)	-.052	-.114	(.02)
FARM	-.005	-.005	(.93)	.005	-.005	(.93)

N = 434

	AFQT Model	ABIL Model
Rsquare	.179	.172
Durbin-Watson	1.86349	1.84606

TABLE X

REGRESSION COEFFICIENTS AND BETA COEFFICIENTS FOR EDUCATION CLASS 2

	AFQT Model			ABIL Model		
Variable	b	beta	(sig)	b	beta	(sig)
AFQT	.003	.181	(.00)	--	--	--
ABIL	--	--	--	.008	.152	(.00)
EDUC	--	--	--	--	--	--
EDSQ	--	--	--	--	--	--
EXP	.135	.682	(.00)	.137	.692	(.00)
EXPSQ	-.008	-.397	(.00)	-.008	-.401	(.00)
SEX	.229	.268	(.00)	.264	.308	(.00)
BLACK	-.026	-.024	(.26)	-.059	-.054	(.01)
OTHER	.039	.019	(.31)	.003	-.001	(.94)
MARSTA	.088	.100	(.00)	.087	.098	(.00)
REGION	-.054	-.061	(.00)	-.060	-.068	(.00)
DEP	-.018	-.035	(.09)	-.020	-.037	(.07)
OLF	-.025	-.048	(.01)	-.024	-.045	(.02)
UNEMPL	-.053	-.091	(.00)	-.054	-.092	(.00)
FARM	-.067	-.055	(.00)	-.069	-.057	(.00)

N = 2162

	AFQT Model	ABIL Model
Rsquare	.266	.259
Durbin-Watson	1.90995	1.90502

TABLE XI

REGRESSION COEFFICIENTS AND BETA COEFFICIENTS FOR EDUCATION CLASS 3

	AFQT Model			ABIL Model		
Variable	b	beta	(sig)	b	beta	(sig)
AFQT	.002	.125	(.00)	--	--	--
ABIL	--	--	--	.004	.162	(.14)
EDUC	--	--	--	--	--	--
EDSQ	--	--	--	--	--	--
EXP	.214	.871	(.00)	.223	.907	(.00)
EXPSQ	-.062	-.087	(.02)	-.022	-.598	(.00)
SEX	.142	.149	(.00)	.167	.175	(.00)
BLACK	.014	.012	(.78)	-.028	-.024	(.57)
OTHER	-.082	-.036	(.36)	-.099	-.043	(.27)
MARSTA	.119	.115	(.01)	.127	.122	(.00)
REGION	-.006	-.006	(.89)	-.010	-.011	(.79)
DEP	.019	.026	(.54)	.018	.024	(.57)
OLF	-.070	-.152	(.00)	-.070	-.152	(.00)
UNEMPL	-.062	-.087	(.02)	-.057	-.081	(.04)
FARM	-.179	-.112	(.00)	-.188	-.117	(.00)

N = 515

	AFQT Model	ABIL Model
Rsquare	.286	.278
Durbin-Watson	1.86895	1.88012

TABLE XII

REGRESSION COEFFICIENTS AND BETA COEFFICIENTS
FOR EDUCATION CLASS 4

	AFQT Model			ABIL Model		
Variable	b	beta	(sig)	b	beta	(sig)
AFQT	.005	.220	(.00)	--	--	--
ABIL	--	--	--	.006	.097	(.02)
EDUC	--	--	--	--	--	--
EDSQ	--	--	--	--	--	--
EXP	.350	.973	(.00)	.365	1.01	(.00)
EXPSQ	-.052	-.707	(.00)	-.055	-.756	(.00)
SEX	.189	.199	(.00)	.217	.229	(.00)
BLACK	.119	.086	(.05)	.017	.012	(.77)
OTHER	-.052	-.017	(.66)	-.135	-.044	(.27)
MARSTA	.053	.055	(.18)	.048	.050	(.23)
REGION	.007	.007	(.86)	.004	.004	(.92)
DEP	-.030	-.027	(.50)	-.038	-.034	(.41)
OLF	-.053	-.087	(.03)	-.065	-.107	(.01)
UNEMPL	-.148	-.152	(.00)	-.153	-.157	(.00)
FARM	-.109	-.065	(.11)	-.149	-.088	(.03)

N = 515

	AFQT Model	ABIL Model
Rsquare	.271	.244
Durbin-Watson	2.08357	2.10322

TABLE XIII

REGRESSION COEFFICIENTS AND BETA COEFFICIENTS FOR EDUCATION CLASS 2/ SALES OCCUPATIONS

	AFQT Model			ABIL Model		
Variable	b	beta	(sig)	b	beta	(sig)
AFQT	.003	.165	(.01)	--	--	--
ABIL	--	--	--	.008	.147	(.02)
EDUC	--	--	--	--	--	--
EDSQ	--	--	--	--	--	--
EXP	.109	.531	(.05)	.094	.456	(.09)
EXPSQ	-.007	-.316	(.23)	-.005	-.244	(.36)
SEX	.362	.403	(.00)	.413	.461	(.00)
BLACK	-.176	-.142	(.03)	-.199	-.161	(.02)
OTHER	.031	.013	(.83)	.041	.017	(.78)
MARSTA	.069	.076	(.25)	.075	.082	(.21)
REGION	-.033	-.035	(.56)	-.041	-.044	(.47)
DEP	-.005	-.008	(.90)	-.019	-.029	(.66)
OLF	-.029	-.050	(.41)	-.013	-.023	(.71)
UNEMPL	.013	.014	(.81)	.023	.026	(.67)
FARM	.022	.018	(.77)	.015	.012	(.84)

N = 194

	AFQT Model	ABIL Model
Rsquare	.382	.373
Durbin-Watson	2.29144	2.30574

TABLE XIV

REGRESSION COEFFICIENTS AND BETA COEFFICIENTS FOR EDUCATION CLASS 2/ CLERICAL-ADMINISTRATIVE OCCUPATIONS

	AFQT Model			ABIL Model		
Variable	b	beta	(sig)	b	beta	(sig)
AFQT	.002	.143	(.00)	--	--	--
ABIL	--	--	--	.005	.119	(.00)
EDUC	--	--	--	--	--	--
EDSQ	--	--	--	--	--	--
EXP	.146	.901	(.00)	.148	.915	(.00)
EXPSQ	-.011	-.639	(.00)	-.011	-.650	(.00)
SEX	.127	.158	(.00)	.147	.184	(.00)
BLACK	.040	.045	(.29)	.015	.017	(.67)
OTHER	.066	.042	(.28)	.029	.018	(.63)
MARSTA	.050	.070	(.08)	.045	.063	(.12)
REGION	-.077	-.097	(.01)	-.085	-.120	(.00)
DEP	-.000	-.000	(.99)	.006	.012	(.76)
OLF	-.001	-.112	(.00)	-.005	-.014	(.72)
UNEMPL	-.064	-.012	(.00)	-.063	-.110	(.00)
FARM	-.108	-.097	(.01)	-.104	-.094	(.02)

N = 578

	AFQT Model	ABIL Model
Rsquare	.212	.208
Durbin-Watson	1.85250	1.85489

TABLE XV

REGRESSION COEFFICIENTS AND BETA COEFFICIENTS
FOR EDUCATION CLASS 2/ SERVICE OCCUPATIONS

	AFQT Model			ABIL Model		
Variable	b	beta	(sig)	b	beta	(sig)
AFQT	.002	.153	(.01)	--	--	--
ABIL	--	--	--	.006	.149	(.01)
EDUC	--	--	--	--	--	--
EDSQ	--	--	--	--	--	--
EXP	.106	.582	(.01)	.106	.586	(.01)
EXPSQ	-.006	-.324	(.14)	-.006	-.317	(.15)
SEX	.129	.168	(.00)	.159	.207	(.00)
BLACK	-.044	-.050	(.44)	-.068	-.077	(.19)
OTHER	-.147	-.075	(.14)	-.174	-.089	(.08)
MARSTA	.042	.049	(.38)	.039	.045	(.42)
REGION	-.039	-.048	(.37)	-.031	-.038	(.48)
DEP	-.008	-.017	(.76)	-.008	-.016	(.78)
OLF	-.045	-.101	(.05)	-.036	-.081	(.11)
UNEMPL	-.048	-.094	(.07)	-.051	-.101	(.05)
FARM	-.106	-.088	(.09)	-.101	-.085	(.10)
N = 349						
Rsquare	.560			.516		
Durbin-Watson	2.24977			2.28590		

TABLE XVI

REGRESSION COEFFICIENTS AND BETA COEFFICIENTS
FOR EDUCATION CLASS 4/ MANAGERIAL-PROFESSIONAL OCCUPATIONS

	AFQT Model			ABIL Model		
Variable	b	beta	(sig)	b	beta	(sig)
AFQT	.007	.274	(.00)	--	--	--
ABIL	--	--	--	.012	.194	(.04)
EDUC	--	--	--	--	--	--
EDSQ	--	--	--	--	--	--
EXP	.319	.919	(.00)	.338	.975	(.00)
EXPSQ	-.054	-.771	(.00)	-.058	-.831	(.00)
SEX	.255	.268	(.00)	.310	.326	(.00)
BLACK	.180	.129	(.03)	.134	.036	(.54)
OTHER	.038	.013	(.82)	-.101	-.036	(.53)
MARSTA	.019	- 020	(.73)	.016	.016	(.78)
REGION	.038	.040	(.49)	.035	.036	(.53)
DEP	-.079	-.057	(.33)	-.103	-.075	(.21)
OLF	-.060	-.093	(.11)	-.083	-.128	(.03)
UNEMPL	-.163	-.144	(.01)	-.164	-.145	(.01)
FARM	-.079	-.057	(.33)	-.135	-.073	(.21)

N = 267

	AFQT Model	ABIL Model
Rsquare	.285	.257
Durbin-Watson	1.93790	1.96207

APPENDIX E

COMPARSION OF REGRESSION COEFFICIENTS ESTIMATED WITHOUT ABILITY MEASURES

	Aggregate		H.S. Grads & Below		College Attendees	
Variables	b	Beta (sig)	b	Beta (sig)	b	Beta (sig)
EDUC	-.014	-.061 (.63)	-.143	-.387 (.05)	.275	.306 (.07)
EDSQ	.004	.446 (.00)	.011	.068 (.00)	-.005	-.519 (.24)
EXP	.134	.724 (.00)	.100	.562 (.00)	.189	.748 (.00)
EXPSQ	-.007	-.420 (.00)	-.004	-.295 (.00)	-.014	-.423 (.00)
SEX	.209	.231 (.00)	.246	.286 (.00)	.166	.169 (.00)
BLACK	-.095	-.082 (.00)	-.126	-.117 (.00)	-.046	-.035 (.19)
OTHER	-.016	-.008 (.59)	.026	.014 (.46)	-.178	-.068 (.01)
MARSTA	.100	.108 (.00)	.091	.105 (.00)	.108	.104 (.00)
REGION	-.055	-.059 (.00)	-.068	-.078 (.00)	-.015	-.015 (.56)
DEP	-.008	-.014 (.39)	-.005	-.010 (.61)	.014	.016 (.59)
OLF	-.039	-.073 (.00)	-.021	-.039 (.03)	-.061	-.116 (.00)
UNEMPL	-.057	-.091 (.00)	-.053	-.100 (.00)	-.092	-.110 (.00)
FARM	-.071	-.054 (.00)	-.040	-.035 (.07)	-.169	-.099 (.00)
N		3732		2279		1074
Rsquare		.247		.229		.285
Durbin-Watson		1.91100		1.92316		2.02419

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